



DEPLETION OF WATER BODIES DUE TO URBANISATION AND ITS MANAGEMENT

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ABSTRACT

Urbanisation is considered as one of the indicators of development in modern world. The process of spreading of the urban bodies in space and time is called as urbanisation. The infrastructural elements including roads, buildings, market places, malls, parks, stadium, educational institutes, hospitals, small scale industrial hubs, entertainment and amusement places etc. are the key associates of urban bodies. The living style and facilities are certainly far better than that of the rural areas. That is why the urbanisation is getting triggered off by the surrounding immigrants. The urban population growth primarily by this means helps in spreading out the urban nucleus at the fastest rate. The accelerated expansion shares the existing demand of basic amenities for which they are becoming scarce day by day. All the big cities along with lower tier towns suffer from the basic resource crunch like water and electricity etc. Water crisis has emerged as a paramount problem in urban areas worldwide. It is a universal observation that all the urban expansions have engulfed almost all the water bodies in their territories and in the peripheral regions. Water bodies are missing at the cost of urban infrastructural development. Depletion of surface water bodies has put lot of adverse impact on the water supply, groundwater development and local climate. Having said that the present trend of urbanisation cannot be abruptly stopped, it is highly required to structure and implement the effective management principles to protect and promote the water bodies in urban localities.

KEYWORDS: Urbanisation, Water bodies, Population growth, Management.

INTRODUCTION:

Water is one of the pre-requisites for survival of human life. The quality of life requires a good amount of water to perform various activities. The global water crisis is clearly visible when it is found that about 1.2 billion people are unable to access to drinking water and about 2.4 billion people lack basic sanitation. Such a big population under water stress at present warns a bitter future for the world. It has been projected that water stressed number will rise from 450 million at present to 2.7 billion by 2025. Particularly the urban areas will severely suffer from the water crisis as they are undergoing very fast expansions.

Urban expansion is observed as a universal activity where exploitation of natural resources has been increased. The very noticeable expression due to such exploitation is the changed land use/land cover patterns. Numerous studies have been carried out on the impact of urban expansion on ecology, environment and natural resources (Shen et al., 2005; Shuqing Zhao et al., 2006; Ramachandraiah & Sheela, 2004; Rathnayaka et al., 2016; Sahasrabudhe et al., 2003;). The urban population of the world as a whole has been growing at the rate of about 3% per year, which is faster than that of the existing world average population growth rate. The United Nations has forecasted that between 1990 and 2050 the urban population will rise to over 5 billion. The increase in urban population density and built up areas directly or indirectly affects hydrological processes through: (a) Change in total runoff or stream flow (b) Alteration of peak flow characteristics, (c) Decline in water quality, and (d) Changes in river's amenities.

Water bodies are the fundamental part of hydrological system and the ecosystem as well. Ponds, tanks, lakes, nals, streams, rivers etc are considered as the water bodies, which hold certain volume of water generally in all seasons of a year. Water bodies serves water requirements of the people for drinking, household uses like washing, for agriculture, fishing and also for religious and cultural purposes. They also perform some of the important indirect activities like recharging of ground water, channelizing water flow to prevent water logging and flooding.

So far as the urban water bodies are concerned they are primarily used both for storing and supplying water to community. Apart from those other important functions they perform are (a) preserving urban ecological balance (b) creating microclimatic regions, which in turn reduce the urban heat island effect over the surrounding area (c) regulating the movement of water within watersheds as well as in the global water cycle (d) enhancing the ground water potentiality by recharging (e) facilitating water purification and sediment retention. The urban water bodies can act as the value provider that ranges from ecological goods and services to direct production values. The stored water in the urban water bodies may be used for consumptive purpose as well as non-consumptive use like irrigation, fishing, ecotourism, scientific research, recreation, cultural and heritage values, landscape and aesthetic values.

URBAN GROWTH:

The whole world is passing through a number of developmental transformations among which urbanisation have been emerged as the dominant activity. It is observed worldwide that a major demographic transition occurs from a rural, agrarian society to an urban, industrial one. As per United Nations, 70% of the

global population will be accommodated in urban areas by 2050 (United Nations, 2001). The developing countries will promote this increase in urban population and particularly India and China lead more than half the growth.

The population in India has already crossed one billion mark, which constitutes about 16% of the total of the world population. Approximately 30% India's population lives in urban areas. This size of urban population in India is rising at fast rate that endorse the process of urbanisation. Urbanisation in India is leading to the haphazard growth and rapid expansion of the cities as more people are congregating in the urban areas. The urban growth has given way to new problems for urban planning and redevelopment in India. The basic amenities such as sewer line, water supply, electricity and road network were designed to limited population. As the population of urban centres during last few decades has increased many folds, the existing urban facilities are becoming unable to cater the demand of the rising population and facilities are under stress conditions. The present population is facing multiple problems like road jams, urban heat island, choking sewer lines, groundwater level decline, air pollution, contamination and pollution of ground and surface water in cities, and shrinking of existing surface water resources. Urbanisation including infrastructural development is undergoing land crisis for which acquiring of wetland, lakes, ponds is a very common practices of urban dwellers. The first impact of urbanization on natural environment in cities is revealed by land use/land cover change and subsequently on water resources both (surface and subsurface water)

DEPLETION OF URBAN WATER BODIES:

Urbanization is one of the main driving forces for large scale changes in land use practices. The exploited activities of humans on land and other resources over time have created a serious problem altering the land cover and degrading the ecosystem (Cieslewicz, 2002). The urban spreading in proportion to population growth render severe pressure on urban water bodies impairing their absorption capacity, deteriorating water quality, disturbing aquatic biodiversity and finally resulting in the water body vanishing (Prasad et al., 2009). Broadly all these activities can be grouped under encroachment and/or eutrophication processes. In the present scenario many water bodies are under encroachment phenomenon converted into land for construction, thereby increasing available urban areas.

Few decades ago urban wetlands maintained a steady supply of water for cities, recharged the groundwater, cooled the city, and prevented flood as they were connected to natural drainage system. Over the years, these very tanks and wetlands have been neglected, encroached upon either to accommodate more houses or to dump waste. This has caused large-scale water crisis and monsoon flooding and water logging, leading to misery and disease. These wetlands that have been protected for centuries are now being ravaged and destroyed in the name of development. As the local water resources like rivers, lakes and groundwater have been squeezed and increasingly polluted, the urban areas are forced to seek water from ever greater distances and expense (Detwyler and Marcus, 1972).

Throughout the world, urban water bodies like ponds, lakes and reservoirs are the first victims of water pollution from sewage. Due to rapid urbanisation the water bodies are facing severe environmental degradation on account of (a) population explosion, (b) large scale industrialization, (c) chemical intensive agriculture,

and (d) water intensive lifestyles. The factors that lead to degradation of water bodies include urbanization, pollution of water due to sewage, nutrient rich agricultural run-off and industrial toxic liquid waste and reclamation leading to siltation. In such conditions they remain as un-used resource for long time and become dumping sites for untreated domestic sewage, industrial effluents and municipal solid waste. In due course of time they are consumed and vanished under constructions.

URBAN WATER BODY MANAGEMENT:

In the urban expansion scenario, the depletion of water bodies has made some acute adversities with regards to the water supply, ground water recharge, urban temperature control, balanced microclimate and flood control etc. The fast rate downsizing and down cutting of surface water bodies is an alarming issue in urban areas. In one hand there is heavy consumption of water bodies in the name of urban infrastructure and modified land use, on the other hand no new water bodies are planned to be brought out in the new city planning and existing ones also. The spatial squeezing of surface water bodies is drastically hampering the ground water development in the urban terrain. It is therefore required to take optimum caution in handling the water bodies while moving on an urban expansion programme. Proper management should be outlined to preserve the existing water bodies and opt for the new ones in future city planning.

Urban water body assessment:

Looking at the quick declining of water bodies in urban areas and its indispensability for life sustenance, an exercise of water body census is to be introduced in every urban area in particular interval of time. Available historical data is to be taken as the base level to determine the declining status. In this process identification of lakes/ponds in the urban areas is very important task. Their location, size, area and common objectives are to be mentioned in the records. Urban water bodies should also include other forms of water sources like storm water drains, step wells, trenches around old forts, wells as well as manmade water bodies like ponds within temples, gurdwaras, mosques and other such public places which are together, commonly called as the "green architecture" of a city.

Protection of existing water bodies:

Water bodies in urban areas exist under varying ownership like public, private, municipal and religion bodies. Additional land requirement for urban growth intend the owner to convert these water bodies into constructible places. Situational necessity and alternate profitability suppress their awareness to think of the broader value of the water bodies for mankind. Hence the existing water bodies are to be protected from disappearance after timely identification. First of all they are protected from encroachment by fencing the shore-line. If any encroachment exists on the bank, it needs to be re-settled/relocated in consultation with affected peoples. The path of inlet and outlet of the water body should be marked and need to be monitored regularly. Any obstruction in the inlet and outlet should be recorded and be removed.

Pollution control and utility enhancement of water bodies:

Old and unused water bodies in due course of time turn to polluted spots and lose their utility. In order to restore them and make them user friendly, numbers of correcting measures are to be taken. Cleaning of water bodies can be done by desilting, de-weeding, aeration, reduction of nutrient, removal of floating and other invasive aquatic plant-species. The water quality should be technologically tested and with remedial measures made suitable to the local condition. Water bodies should be prevented from any outfall of domestic/ industrial sewage into them. Only treated effluent, as per effluent standard of the State Pollution Control Board, may be allowed to dispose into the water bodies. Catchment area treatment like afforestation, storm water drainage management, silt traps, etc., may be undertaken. Land around the lake and at a certain distance from its shore-perimeter should be declared as eco-sensitive area and dumping of any solid waste into these areas should be made a punishable offence. For collection of solid waste, collection-bins need to be placed around the Water Body and regular cleaning of solid waste should be undertaken. Most of the water bodies are fed with the storm-water during monsoon season to meet annual requirement of water in their bed. The beginning run off brings huge amount of organic load and silt in to the lake, which are most hazardous and alter their water chemistry beyond easy solutions. Entry of such storm water loads must be checked to protect the water bodies from pollution and siltation.

Urbanisation and water bodies to grow simultaneously:

Urbanisation is a universal process attributing to development. Water bodies are indispensable elements for life sustenance, growth, balanced ecosystem and overall development of human civilisation. Hence a complete and proper urbanisation process may not be occurred without the existence water bodies. Urbanization should be planned and executed in such a manner that high priority is accorded to local water availability as well its appropriate uses. Urbanisation should approach water-centric expansion that leads balanced natural growth to cities. Urbanization has to take into account the delineation and protection of catchment areas, feeder channels and command areas of lakes, ponds, etc., and restore or protect them to the extent possible. Both urbanisation and water body preservation should be managed and monitored by appropriate mechanism through PPP mode.

CONCLUSION:

Water bodies, may it be surface water body or ground water aquifers, are essential natural resources for existence and development of human civilisation. The universal occurrence of urbanisation needs more water and at the same time it targets the water bodies to manage the space crisis. The consumption of water worldwide is doubling every 20 years, which is more than twice the rate of increase in population. In urban areas this situation is quite acute. Such situation would have been managed by the presence of plenty water bodies spreading abundantly in urban areas. However the weightage of water crisis and balanced environment surrenders before the attitude of profitability in using the water bodies for constructions and other use. The existing water bodies are shrinking very rapidly and most of the remained ones are either used as dumping sites for domestic/municipal wastes or sewage ponds. There is hardly seen any new water bodies that come up in urban areas. If such thing continues the process of urbanisation shall fail to provide the healthy environment to the dwellers.

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